REMARKS

This Amendment is submitted in reply to the Non-Final Office Action dated May 14, 2010. Applicant respectfully requests reconsideration and further examination of the patent application pursuant to 37 C.F.R. § 1.111.

Summary of the Examiner's rejections

Claims 33, 50, 52, 55, 57, 60 and 63 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Naden (US 7,184,703) in view of Zhu (US 7,085,314) and further in view of Kanoaka (US 2003/0182617).

Claims 34, 36-37, 53-54 and 61-62 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Naden (US 7,184,703) in view of Zhu (US 7,085,314) and Kanoaka (US 2003/0182617) and further in view of Sim (US 7,236,591).

Claims 38-43 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Naden (US 7,184,703) in view of Zhu (US 7,085,314) and Kanoaka (US 2003/0182617) and further in view of Kostusiak (US 5,115,224).

Claims 44-49, 58 and 59 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Naden (US 7,184,703) in view of Zhu (US 7,085,314) and Kanoaka (US 2003/0182617) and further in view of Applicant's admitted prior art (AAPA).

Claims 56 and 64 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Naden (US 7,184,703) in view of Zhu (US 7,085,314) and Kanoaka (US 2003/0182617) and further in view of Khorram (US 7,130,601).

Claim 51 stands objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 65 was allowed.

Summary of claim amendments

Applicant has amended claims 33, 52 and 60, and added new claims 66-77. The support for the amendments to claims 33, 52 and 60 and new claims 66-63 can be found by reading the "Description of Related Art" section and then the "Detailed Description of the Drawings" section in view of page 4, lines 14-23, page 6, line 27

through page 7, line 5, page 14, lines 9-28, and FIG. 7A of the originally filed patent application. The support for the new claim 69 can be found in original claim 33, page 13 lines 15-26, and page 14, lines 21-25 of the originally filed patent application. The support for the new claims 70-75 can be found in original claims 6-11 of the originally filed patent application. No new subject matter has been added.

Remarks regarding objected claim 51

Claim 51 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Applicant submits that amended independent claim 33 (the base claim to dependent claim 51) is patentable over the cited art as discussed in detail below. Accordingly, Applicant respectfully requests the removal of this particular objection.

Remarks regarding the §103(a) rejections

Applicant respectfully submits that the amended independent claim 33 is patentable in view of Naden, Zhu, Kanoaka or any combination thereof. The amended independent claim 33 recites the following:

> 33. A wireless relay based network, comprising:
> a first node;
> at least one relay station; and
> a second node;
> wherein said first node communicates with said second node via said at least one relay station, wherein each relay station is operative to:
> receive a digital communication from said first node;
> compute a plurality of reliability values for a plurality of symbols in the received digital communication, where each reliability value indicates how likely the corresponding symbol is a binary 0 or a binary 1; and,
> <u>transmit a digital communication which has a plurality of symbols that are same as the plurality of symbols in the received digital communication but also has the computed reliability values embedded therein to said second node</u> (emphasis added).

Applicant has amended independent claim 33 to recite a new limitation where "each relay node is operative to transmit a digital communication which has a plurality of symbols that are same as the plurality of symbols in the received digital communication but also has the computed reliability values embedded therein to said second node",

Naden, Zhu, Kanoaka or any combination thereof fails to disclose or suggest this newly recited limitation. As the Examiner noted Naden discloses a relay node that receives a digital communication from a source node (see paragraph 4 in pending Office Action). Zhu teaches a relay node that receives a first signal, modifies the first signal using a digital filter to form a second signal, and transmits the second signal with amplification. Hence, Zhu does not teach or suggest a relay node that transmits a digital communication which has a plurality of symbols that are same as the plurality of symbols in the received digital communication but also has the computed reliability values embedded therein to said second node. Instead, Zhu teaches a relay node that receives a first signal and transmits a second signal which is different than the first signal. Kanoaka does not correct Zhu's deficiency because Kanoaka teaches a decoder that corresponds to a turbo encoder which performs a posteriori probability decoding (APP). Thus, even if Zhu's relay node incorporated Kanoaka's APP it would still receive a first signal and transmit a second signal which is different than the first signal. The secondary cited art Sim, Kostusiak, and Khorram do not correct Zhu's deficiency. In view of at least the foregoing, Applicant submits that the aforementioned substantial differences between the amended independent claim 33 and the cited prior art are indicative of the patentability of the amended independent claim 33 and the corresponding dependent claims 34-51.

Referring now to the currently amended independent claims 52 and 60, Applicant respectfully submits that these claims are patentable in view of the cited prior art. The amended independent claims 52 and 60 each recite the same or similar distinguishing limitations that have been discussed above with respect to amended independent claim 33. As such, the aforementioned remarks regarding the patentability of the amended independent claim 33 apply as well to the amended independent claims 52 and 60. Accordingly, Applicant respectfully requests the allowance of the currently amended independent claims 52 and 60 and their corresponding dependent claims 53-59 and 61-64.

Remarks regarding the new claims 66-75

Applicant respectfully submits that the new independent claim 66 is patentable over the cited prior art. The new independent claim 66 is as follows:

> 66. The wireless relay based network of Claim 33, wherein said at least one relay station by computing the plurality of reliability values for a plurality of symbols in the received digital communication and transmitting the digital communication which has the plurality of symbols that are the same as the plurality of symbols in the received digital communication but also has the computed reliability values embedded therein to the second node avoids having to make hard decisions on the plurality of symbols in the received digital communication, and wherein the second node makes hard decisions on the plurality of symbols in the received digital communication by taking into account the reliability values for the plurality of symbols in the received digital communication.

As can be seen, the new dependent claim 66 recites a new limitation "wherein said at least one relay station by computing the plurality of reliability values for a plurality of symbols in the received digital communication and transmitting the digital communication which has the plurality of symbols that are the same as the plurality of symbols in the received digital communication but also has the computed reliability values embedded therein to the second node avoids having to make hard decisions on the plurality of symbols in the received digital communication, and wherein the second node makes hard decisions on the plurality of symbols in the received digital communication by taking into account the reliability values for the plurality of symbols in the received digital communication". This newly recited limitation indicates how the claimed relay station can efficiently avoid having to make "hard decisions" on a received digital communication in a manner that effectively addresses a drawback with the prior art as discussed in the "Description of Related Art" section of the pending patent application. In view of at least the foregoing, Applicant submits that the new dependent claim 66 is patentable over the cited prior art.

Referring now to the new dependent claims 67-68, Applicant respectfully submits that these claims are patentable in view of the cited prior art. The new dependent claims 67-68 each recite the same or similar distinguishing limitations that have been

discussed above with respect to the new dependent claim 66. As such, the aforementioned remarks regarding the patentability of the new dependent claim 66 apply as well to the new dependent claims 67-68. Accordingly, Applicant respectfully requests the allowance of the new dependent claims 67-68.

Applicant respectfully submits that the new independent claim 69 is patentable over the cited prior art. The new independent claim 69 is as follows:

> 69. A wireless relay based network, comprising:
> a first node;
> at least one relay station; and
> a second node;
> wherein said first node communicates with said second node via said at least one relay station, wherein each relay station is operative to:
> receive a digital communication from said first node;
> compute a plurality of reliability values for a plurality of symbols in the received digital communication, where each reliability value indicates how likely the corresponding symbol is a binary 0 or a binary 1; and,
> transmit a digital communication which corresponds to the received digital communication but also has the computed reliability values implicitly embedded therein to said second node (emphasis added).

Applicant refers the Examiner to arguments made in the Amended dated March 23, 2010 for a detailed discussion about how Naden and Zhu or any combination thereof failed to disclose or suggest this new independent claim 69 not counting the new limitation "implicitly embedded". Kanoaka does not teach the new limitation "implicitly embedded". Instead, Kanoaka discloses a decoder that corresponds to a turbo encoder which performs a posteriori probability decoding (APP). Applicant also submits that Kostusiak does not teach the new limitation "implicitly embedded". In this regard, the Examiner has indicated that "Kostusiak teaches a personal security system network whereby each receiving transceiver will transmit a relay signal, which combines (i.e. embeds) the emergency signal with additional received-signal-strength indication (RSSI) information" (see paragraph 12 on page 7 of the Final Office Action). In particular, Kostusiak teaches a receiving transceiver which sends a relay signal that explicitly combines an emergency signal and RSSI information (see col. 3, line 1 through col. 4, line 22). Sim and Khorram do not correct this deficiency. In view of at least the foregoing, Applicant submits that the aforementioned substantial difference

between the new independent claim 69 and the cited prior art are indicative of the patentability of the new independent claim 69 and the corresponding dependent claims 70-75.

Furthermore, Applicant respectfully submits that since the cited prior art fails to disclose or suggest the new independent claim 69 then it follows that the corresponding new dependent claims 70-75 are patentable as well over the cited prior art or any combination thereof. In the past, the Examiner has consistently cited Kostusiak to reject the pending dependent claims 38-43 and since the new dependent claims 70-75 are similar to those claims the Applicants will repeat those arguments where it is explained in detail how Kostusiak does not teach or suggest the limitations recited in new dependent claims 70-75. Kostusiak teaches the following:

> A personal security system includes at least one movable transmitter adapted to produce an emergency signal transmission when activated and a plurality of transceivers adapted to receive emergency signal transmissions from the movable transmitter. The received strength of an emergency signal received by one of the transceivers is compared with the received signal strength of an emergency signal received by other of the transceivers, and an alarm signal is produced by a transceiver in response to receipt of a transmission whose signal strength is stronger than any other transmission signal strength to which it has been compared. The alarm signal may include a code identifying both the activated movable transmitter and the transceiver producing the alarm signal.

(see abstract).

The Examiner has indicated that "Kostusiak teaches a personal security system network whereby each receiving transceiver will transmit a relay signal, which combines (i.e. embeds) the emergency signal with additional received-signal-strength indication (RSSI) information" (see paragraph 13 of the pending Office Action). In particular, Kostusiak teaches a receiving transceiver which sends a relay signal that explicitly combines an emergency signal and RSSI information (see col. 3, line 1 through col. 4, line 22). Kostusiak's RSSI information is a single measurement which is based on the power of the received emergency signal. In contrast, the present invention's transmitted digital communication has implicitly embedded therein a plurality of reliability values

which are based on the reliability of a plurality of symbols in the received digital communication. This is an important difference since the present invention can implicitly embed the reliability values in different ways to transmit the digital communication. For instance, the new dependent claim 70 recites one way that the claimed relay station can use the plurality of reliability values to transmit the digital communication. The new dependent claim 70 recites the following:

> 70. The wireless relay based network of Claim 69, wherein the computed reliability values are implicitly embedded in the transmitted digital communication such that high reliability symbols are transmitted with higher power and low reliability symbols are transmitted with lower power to said second node.

As can be seen, the claimed relay station uses the plurality of reliability values to transmit the high reliability symbols at a higher power and the low reliability symbols at a lower power. Kostusiak's receiving transceiver having the single RSSI measurement would not be able to use the single RSSI measurement to transmit different parts of the emergency signal at different powers. Moreover, Applicant has defined "reliability values" such that "each reliability value indicates how likely the corresponding symbol (within the received digital communication signal) is a binary 0 or a binary 1". Thus, Applicant has defined the claimed "reliability values" in a way that differentiates them from Kostusiak's RSSI. Similar defects are present with respect to the new dependent claim 71. The new dependent claim 71 recites the following:

> 71. The wireless relay based network of Claim 69, wherein the computed reliability values are implicitly embedded in the transmitted digital communication in a manner where the reliability symbols are used to modulate an amplitude of the digital communication transmitted to said second node.

As can be seen, the claimed relay uses the plurality of reliability values to modulate an amplitude of the transmitted digital communication. One skilled in the art would appreciate that it would take more than one reliability value to modulate the amplitude of the transmitted digital communication. Kostusiak's receiving transceiver having the single RSSI measurement would not be able to use the single RSSI measurement to modulate the relay signal. Moreover, Applicant has defined "reliability

values" such that "each reliability value indicates how likely the corresponding symbol (within the received digital communication signal) is a binary 0 or a binary 1". Thus, Applicant has defined the claimed "reliability values" in a way that differentiates them from Kostusiak's RSSI. Similar defects are present with respect to the new dependent claim 72. The new dependent claim 72 recites the following:

> 72.   The wireless relay based network of Claim 69, wherein the computed reliability values are implicitly embedded in the transmitted digital communication in a manner where the reliability symbols are used to modulate a phase of the digital communication transmitted to said second node.

As can be seen, the claimed relay uses the plurality of reliability values to modulate a phase of the transmitted digital communication. One skilled in the art would appreciate that it would take more than one reliability value to modulate the phase of the transmitted digital communication. Kostusiak's receiving transceiver having the single RSSI measurement would not be able to use the single RSSI measurement to modulate the relay signal. Moreover, Applicant has defined "reliability values" such that "each reliability value indicates how likely the corresponding symbol (within the received digital communication signal) is a binary 0 or a binary 1". Thus, Applicant has defined the claimed "reliability values" in a way that differentiates them from Kostusiak's RSSI. Similar defects are present with respect to the new dependent claim 73. The new dependent claim 73 recites the following:

> 73.   The wireless relay based network of Claim 69, wherein the computed reliability values are implicitly embedded in the transmitted digital communication in a manner where the reliability symbols are used to vary a bandwidth of the digital communication transmitted to said second node.

As can be seen, the claimed relay uses the plurality of reliability values to vary a bandwidth of the transmitted digital communication. One skilled in the art would appreciate that it would take more than one reliability value to vary the bandwidth of the transmitted digital communication. Kostusiak's receiving transceiver having the single RSSI measurement would not be able to use the single RSSI measurement to vary the bandwidth of the relay signal. Moreover, Applicant has defined "reliability values" such that "each reliability value indicates how likely the corresponding symbol (within the

received digital communication signal) is a binary 0 or a binary 1". Thus, Applicant has defined the claimed "reliability values" in a way that differentiates them from Kostusiak's RSSI. Similar defects are present with respect to the new dependent claim 74. The new dependent claim 74 recites the following:

> 74. The wireless relay based network of Claim 69, wherein the computed reliability values are implicitly embedded in the transmitted digital communication in a manner where the reliability symbols are used to vary a signal time occupation of the digital communication transmitted to said second node.

As can be seen, the claimed relay uses the plurality of reliability values to vary a signal time occupation of the transmitted digital communication. One skilled in the art would appreciate that it would take more than one reliability value to vary the signal time occupation of the transmitted digital communication. Kostusiak's receiving transceiver having the single RSSI measurement would not be able to use the single RSSI measurement to vary the signal time occupation of the relay signal. Moreover, Applicant has defined "reliability values" such that "each reliability value indicates how likely the corresponding symbol (within the received digital communication signal) is a binary 0 or a binary 1". Thus, Applicant has defined the claimed "reliability values" in a way that differentiates them from Kostusiak's RSSI. Similar defects are present with respect to the new dependent claim 75. The new dependent claim 75 recites the following:

> 75. The wireless relay based network of Claim 69, wherein the computed reliability values are implicitly embedded in the transmitted digital communication in a manner where the reliability symbols are used to vary a signal constellation size of the digital communication transmitted to said second node.

As can be seen, the claimed relay uses the plurality of reliability values to vary a signal constellation size of the transmitted digital communication. One skilled in the art would appreciate that it would take more than one reliability value to vary the signal constellation size of the transmitted digital communication. Kostusiak's receiving transceiver having the single RSSI measurement would not be able to use the single RSSI measurement to vary the signal constellation size of the relay signal. Moreover, Applicant has defined "reliability values" such that "each reliability value indicates how

likely the corresponding symbol (within the received digital communication signal) is a binary 0 or a binary 1". Thus, Applicant has defined the claimed "reliability values" in a way that differentiates them from Kostusiak's RSSI. In view of at least the foregoing, Applicant submits that the aforementioned substantial differences between the cited art and the new dependent claims 70-75 are indicative of the patentability of the new dependent claims 70-75.

CONCLUSION

In view of the foregoing remarks, Applicant believes all of the claims currently pending in the application to be in a condition for allowance. Therefore, Applicant respectfully requests that the Examiner withdraw all objections and rejections and issue a Notice of Allowance for pending claims 33-75.

The Commissioner is hereby authorized to charge any fees for this paper to Deposit Account No. 50-1379.

Applicant requests a telephonic interview if the Examiner has any questions or requires any additional information that would further or expedite the prosecution of the Application.

Respectfully submitted,

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